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A SEVERE WEATHER CLIMATOLOGY FOR THE COUNTY WARNING AREA OF THE NATIONAL WEATHER SERVICE OFFICE NASHVILLE, TENNESSEE

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1. Introduction

This study is a severe weather climatology for the National Weather Service Office at Nashville, Tennessee, which provides weather services for all of middle Tennessee. The NWSO Nashville County Warning Area (CWA) consists of 44 counties. The CWA extends from the Kentucky state line in the north to the Alabama state line in the south, and from the Tennessee River in the west to the Cumberland Plateau in the east (Fig. 1).

To develop a comprehensive severe weather climatology, all facets of severe weather have been studied, including tornado occurrences, severe hail and damaging wind events. The tornado climatology includes 236 tornadoes reported within the CWA during the years 1950-1995. Severe hail is defined by the NWS as having a diameter of at least ¾ in. Two hundred and twenty-two severe hail events occurring within the Nashville CWA during the years 1955-1993 have been analyzed. For a more detailed study, hail events were categorized as large (0.75-1.74 in), very large (1.75-2.74 in), and extremely large (2.75+ in).

Finally, 814 damaging wind events have also been included. These events occurred within the Nashville CWA during the years 1955-1993. Damaging wind events associated with thunderstorms are defined in various ways. A wind gust of at least 50 kt (58 mph) is considered severe, and structural damage caused by such winds also constitutes a damaging wind event, as do trees and power lines being blown down.

2. Data

The data used for this study were obtained from the NOAA/NWS Storm Prediction Center (SPC), formerly the National Severe Storms Forecast Center, which maintains a damaging wind and hail database dating back to 1955, and a tornado event database dating back to 1950. Those data were analyzed using the CLIMO software described by Vescio (1995). The data set is similar to that accessed by the SVRPLOT program by Hart (1993). Damaging wind and hail data for 1972 were not archived at the SPC. To fill this void, data from *Storm Data* (NOAA 1972) were used.

Murphy and Vescio (1996) indicated that aspects of severe weather reporting have led to problems in developing a severe weather climatology. Several other authors, including Grazulis and Abbey (1983), Doswell (1985), and Hales (1993) have shown that Such factors as population and roadway density, weather sensitivity of the media and public, increased awareness of the citizenry, and increased efforts to seek out reports in the wake of a severe weather episode, have all been cited as sources for skewing data on which a climatology can be used. Biases are frequently seen in spatial distributions and in yearly frequency data.

Ostby (1993) also stated that "data can be made more reliable (biases reduced) by focusing on events on the stronger end of the intensity spectrum." These concerns should be kept in mind when considering information summarized in this study.

3. Preliminary Considerations

a. Population Distribution

Population varies greatly across the Nashville, Tennessee, CWA (Fig. 2). U.S. Census Bureau data from 1990 show that the population ranged from a low of 4,548 in Pickett County to 510,784 in Davidson County. The largest population concentration is associated within the Nashville metropolitan area. Other population concentrations include the cities of Murfreesboro (Rutherford County), Gallatin and Hendersonville (Sumner County), and Clarksville (Montgomery County).

b. Topographical Considerations

The Nashville CWA has variations in topography generally on the order of several hundred feet (Fig. 3). In the westernmost portions of the CWA is a region of gently rolling plains sloping gradually from 200 to 250 ft in the west to about 600 ft ASL in the hills overlooking the Tennessee River (Fig. 3). The hilly Highland Rim, a wide circle touching the Tennessee River Valley in the west and the Cumberland Plateau in the east, makes up the whole of middle Tennessee.

The Highland Rim ranges from about 600 ft in elevation along the Tennessee River to 1,000 ft on its eastern edge, and rises 300 to 400 ft above the Central Basin, which is a rolling plain of about 600 ft average elevation. A crescent of hills reaching to just over 1,000 ft above sea level lies south of Nashville. The Cumberland Plateau, with an average elevation of 2,000 ft above sea level, extends roughly northeast to southwest across middle Tennessee in a belt 30-50 mi wide. It is bounded by the Highland Rim in the west and overlooks the Great Valley of Tennessee in the east. The vegetative cover across much of middle Tennessee is a mixture of deciduous and evergreen forests.

4. Tornado Climatology

During the years 1950-1995, 236 tornado events were documented across the Nashville CWA. A list of these events is contained in the Appendix. Figure 4 depicts the number of tornadoes by F-Scale. The F-Scale (Table 1) was developed by Fujita (1981) for the purpose of classifying tornadoes by wind speed. As expected, most tornadoes were weak (F0-F1). In fact, of all tornadoes documented in this study, 65.7 percent were classified as weak, whereas only 4.2 percent were classified as violent (F4-F5). However, a third of all reported tornadoes (34.3 percent) were classified as strong or violent (F2 or greater) for middle Tennessee as a whole.

Table 1. Fujita damage scale (F-scale)

F#	Qualifier	Intensity	Wind Speed Range
F0	Gale Tornado	weak	40-72 mph
F1	Moderate Tornado	weak	73-112 mph
F2	Significant Tornado	strong	113-157 mph
F3	Severe Tornado	strong	158-206 mph
F4	Devastating Tornado	violent	207-260 mph
F5	Incredible Tornado	violent	261-318 mph

Source: Fujita 1981

It must be noted that the number of documented F0 tornadoes is far fewer than F1 cases. The number of reported F0 events is still likely an underrepresentation, since many F0 tornadoes no doubt go undetected, especially in sparsely populated areas and at night, because of their small size and relatively small impact.

Conversely, although representing only 4.2 percent of all events, violent tornadoes have been responsible for 69.1 percent of all tornado deaths in the Nashville CWA during the period of study (Fig. 5). The impact of the violent tornadoes cannot be overemphasized.

Figure 6 shows tornadoes classified by damage category, or by the dollar amount of property damage which they cause. Note that most tornadoes are classified in damage categories 4 and 5, which corresponds to property damage ranging from $5,000 to $500,000. However, tornadoes in middle Tennessee have been classified as high as damage category 8, which corresponds to property damage ranging from $50 million to $500 million. Table 2 summarizes the categories of storm damage.

Table 2. Damage categories

Damage Category	Damage Amount in Dollars
1	less than 50
2	50 to 500
3	500 to 5,000
4	5,000 to 50,000
5	50,000 to 500,000
6	500,000 to 5,000,000
7	5,000,000 to 50,000,000
8	50,000,000 to 500,000,000

Source: Storm Prediction Center (SPC), National Weather Service

Tornadoes have also been sorted by month of the year and time of the day. Figure 7 shows that most tornadoes in middle Tennessee occur during the spring months of March, April, and May, with May being the month of greatest tornado frequency. Also, tornadoes occur with greatest frequency between the hours of 2 p.m. and 8 p.m. CST, with the hour ending at 5 p.m. being the most active (Fig. 8).

Previous tornado climatologies (McNulty et al. 1979; Gaffin and Smith 1995) have shown that a secondary "tornado season" during November and December occurs in the southeastern United States. Extensive analysis of the Nashville CWA statistics covering the time period 1950-1995 shows that fewer than five tornadoes occurred in September and October, but tornado reports increased in November to eight, with only two tornadoes in December (Fig. 7). A secondary maximum is barely noticeable in middle Tennessee for November/December.

Although the frequency of occurrence is small, some of middle Tennessee's most damaging and deadly tornadoes have occurred during the late autumn and winter months. From 1950-1995 in November, there have been three reported F2 tornadoes, four F1s and one F0. The two December tornadoes were F1 and F4. The infamous F4 tornado occurred on December 24, 1988, and moved northeast through Williamson County from the Rebel Meadows area of Franklin, Tennessee, to the Brenthaven area of Brentwood, Tennessee. The tornado destroyed 54 homes, 13 apartment units, 31 businesses and six parked airplanes. One man was killed when a roof collapsed. Total property damage was estimated at $8 million (Grazulis 1993).

Finally, tornadoes were sorted geographically and their occurrences normalized for the counties in the CWA. The methodology here is quite simple. First, tornadoes were sorted by county. The total number of tornadoes during the period 1950-1995 for each county was then divided by that county's total area, then the result was multiplied by 417. (The value 417 represents the average size of the 44 counties in the Nashville CWA.) The numerical values shown in Fig. 9 therefore represent the number of tornadoes per 417 mi^2 occurring during the period of study in each county.

Areas in middle Tennessee which appear to be most prone to tornadoes include the Nashville/ Gallatin/Hendersonville metropolitan regions in the north, and the southernmost Tennessee counties along the west edge of the Cumberland Plateau. The high frequency of occurrence across the Nashville metropolitan area can be attributed at least partially to the high population density. The maximum in east-central to south-central middle Tennessee is along the windward side of the Cumberland Plateau, a sparsely populated area, so orographic enhancement is a more likely cause of the relatively high frequency of tornadoes, as opposed to population. Regions that seem to be least prone to tornadoes include west and northwest middle Tennessee (just east of the Tennessee River) and extreme northeast middle Tennessee.

5. Severe Hail Climatology

Severe hail is defined as having a diameter of at least ¾ in. This phase of the study comprises 222 severe hail events which occurred in middle Tennessee during the years 1955-1993. Hail events were analyzed according to month of the year and hail size, and time of day and hail size.

The hail events were categorized into three sizes; large (0.75-1.74 in), very large (1.75-2.74 in), and extremely large (2.75+ in).

Similar to tornado occurrences, the spring months of March, April, and May have the highest frequency of severe hail events, with April being the month of greatest frequency (Fig. 10). Figure 11 shows severe hail events sorted by hour of day. Again, the afternoon hours of 1 p.m. until 7 p.m. CST represent the period of highest frequency, with 5 p.m. being the hour of highest frequency. Of the 222 severe hail events studied, 60.8 percent were large, 36.0 percent were very large, and 3.2 percent were extremely large size.

6. Damaging Wind Climatology

Eight hundred and fourteen damaging wind events which occurred in middle Tennessee during the years 1955-1993 were analyzed for this study. When analyzed according to the month of the year and hour of day, high wind events showed somewhat different temporal characteristics than tornadoes and severe hail events. Figure 12 shows that high wind events occur frequently during the summer months of June and July, with a secondary maximum occurring during the spring. In the Nashville CWA, June was the month with the highest frequency of high wind events. This finding correlates well with the study done by Kelly et al. (1985) which showed that for the entire United States, the summer months of June through August account for nearly 55 percent of all yearly reports. Hail and tornadoes, on the other hand, are relatively infrequent in the summer months in the Nashville CWA.

Figure 13 shows that the afternoon and early evening hours of 1 p.m. until 10 p.m. CST represent the peak time of day for damaging wind events. The hour ending at 4 p.m. had the most reported events. This is very similar to the hourly distribution of tornadoes and hail events in the CWA. Gaffin and Smith (1995) indicate that there has been a rise in damaging wind reports in recent years, and the reason may most likely be attributed to improvements in the NWS spotter network, along with an increase in population in the mid-South. To further improve spotter reports, an organized amateur radio network was implemented in the 1970s for the Nashville CWA. Hales (1993) showed that there have been improvements in the NWS warning verification program since its implementation in 1980.

7. Conclusion

The purpose of this study was to depict the climatology of severe weather across middle Tennessee in temporal and geographical terms. We analyzed 1272 occurrences of tornadoes, large hail, and damaging convective winds for this purpose. It has been shown that the afternoon and early evening hours are the peak times for severe weather events to occur in middle Tennessee, with the spring and early summer months representing the peak time of the year for severe weather to occur. The incidence of damaging winds tends to extend later in the summer than hail or tornadoes.

An attempt was made to highlight tornado "alleys" in middle Tennessee in order to determine which areas might be more favorable for tornado development. There is a high incidence of

tornado reports in the Nashville area and in north-central Tennessee, as might be expected because of the population concentration. The numbers compare closely with areas in south-central Tennessee. Since south-central Tennessee is much more sparsely populated, this suggests that the latter area may in fact have even more tornadoes (many of which go unreported) than occur to the north. Weaker tornadoes are probably less likely to be reported because of relatively sparse population and topography.

Overall, the south-central, north-central, and east-central parts of middle Tennessee seem to favor tornado development more than other areas, such as west, northwest, and northeast-middle Tennessee. Further studies will be completed to determine the specific factors involving tornado development in these areas.

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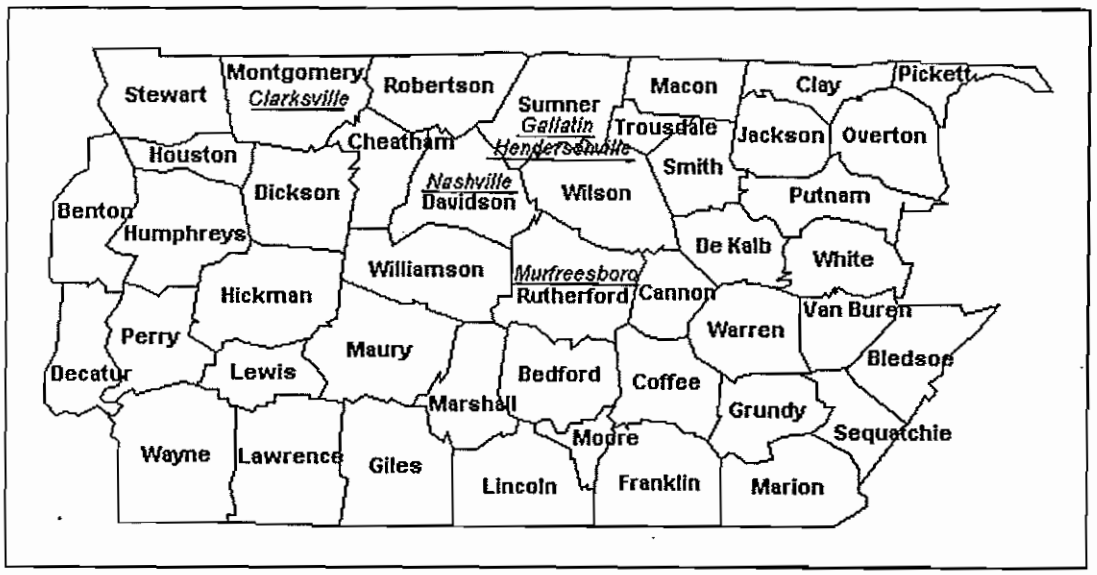

Fig. 1. NWSO Nashville CWA. Underlined names indicate largest cities.

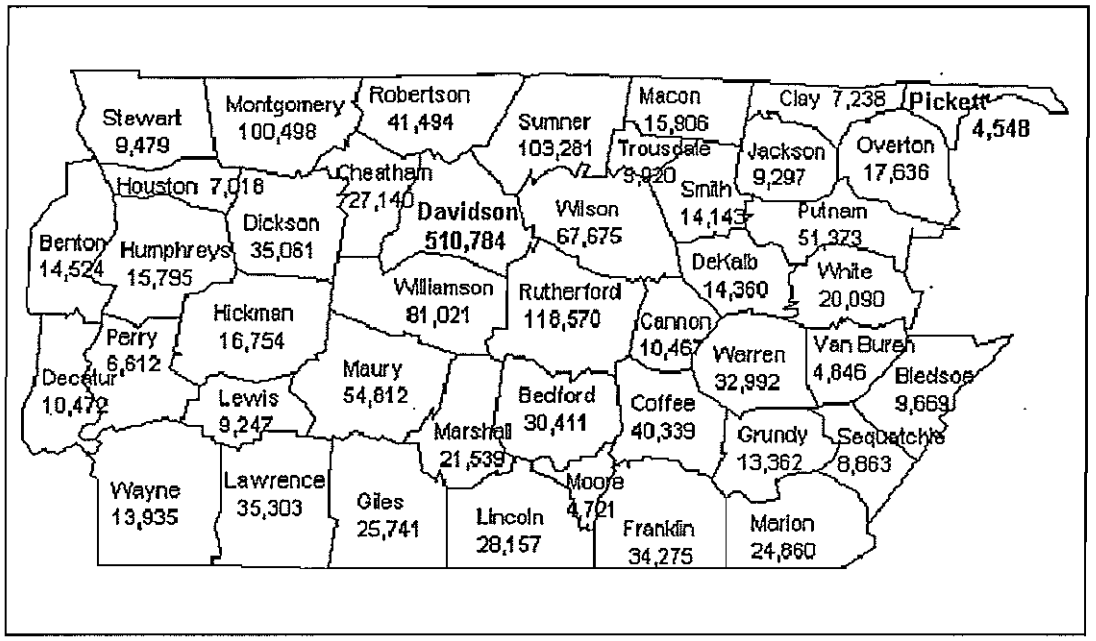

Fig. 2. NWSO Nashville CWA population by counties. (Source: U.S. Census Bureau 1990 data.)

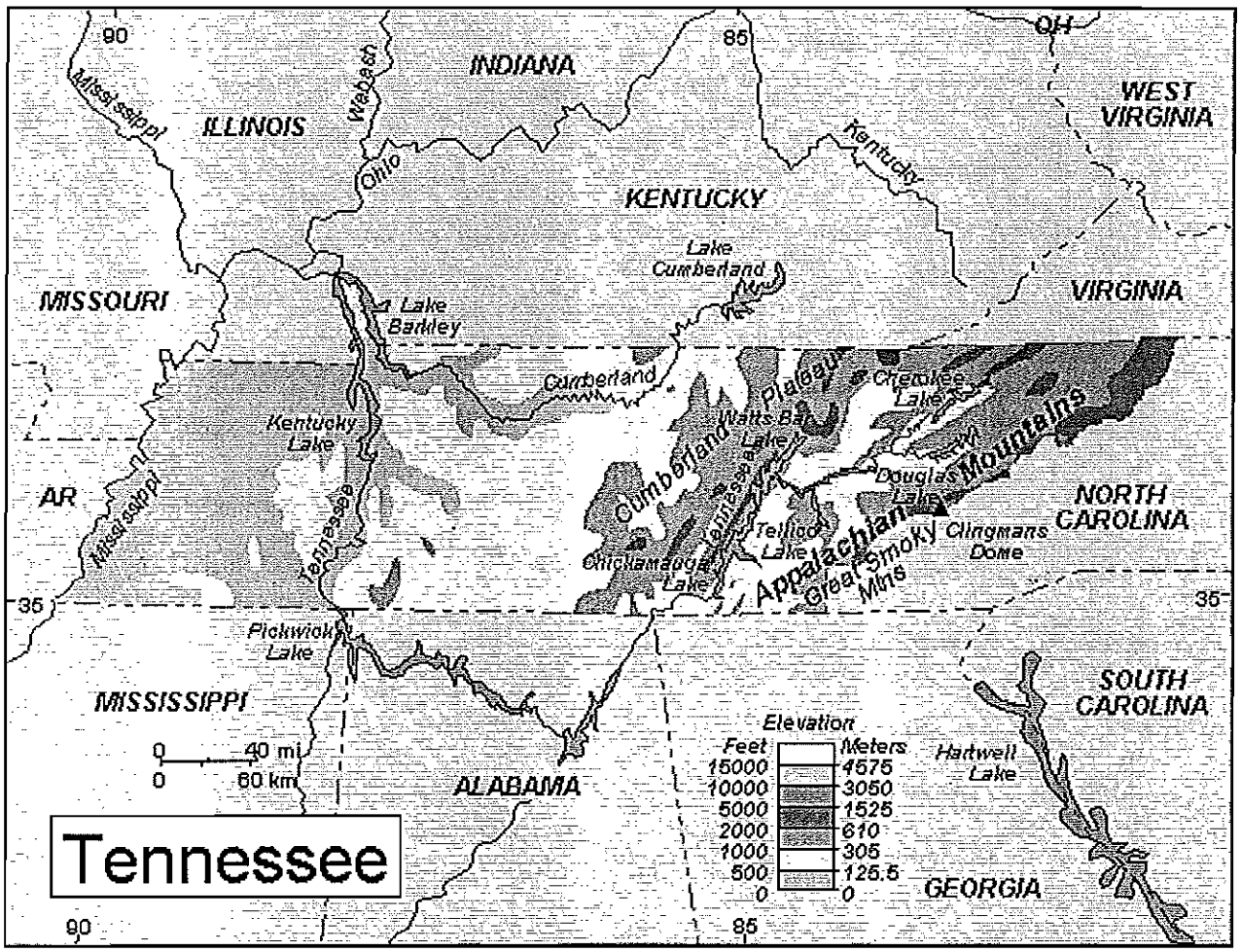

Fig. 3. NWSO Nashville CWA topography. (Source: The Software Toolworks U.S. Atlas CD-COM)

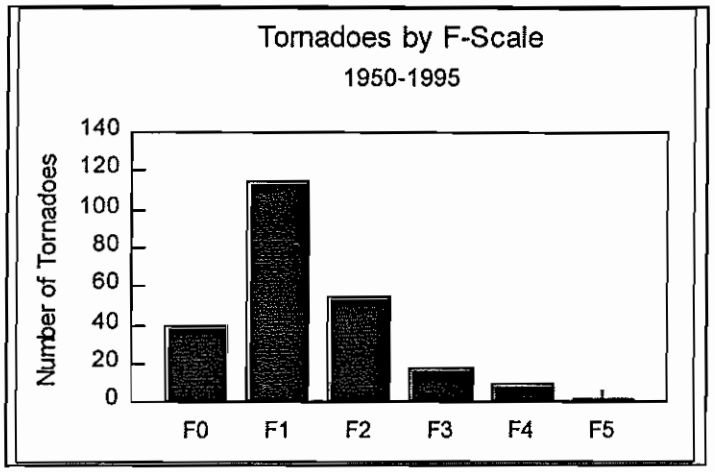

Fig. 4. NWSO Nashville CWA tornadoes (1950-1995) by F-scale. See Table 1 for explanation.

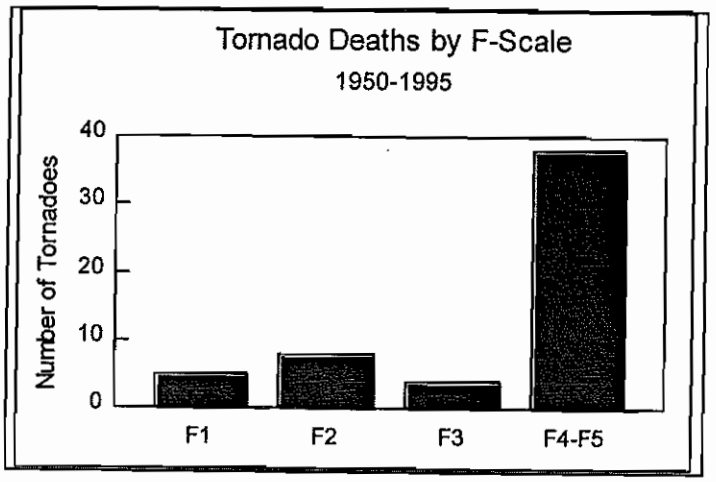

Fig. 5. NWSO Nashville CWA tornado-related deaths, by F-scale (1950-1995).

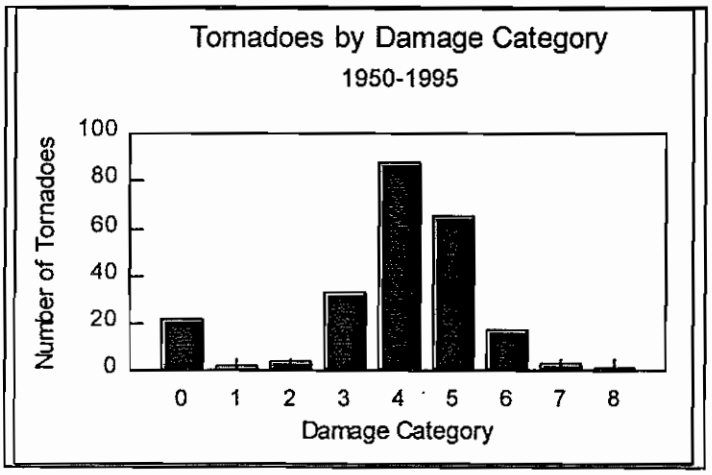

Fig. 6. NWSO Nashville CWA tornado damage, by categories (1950-1995). See Table 2 for explanation of categories.

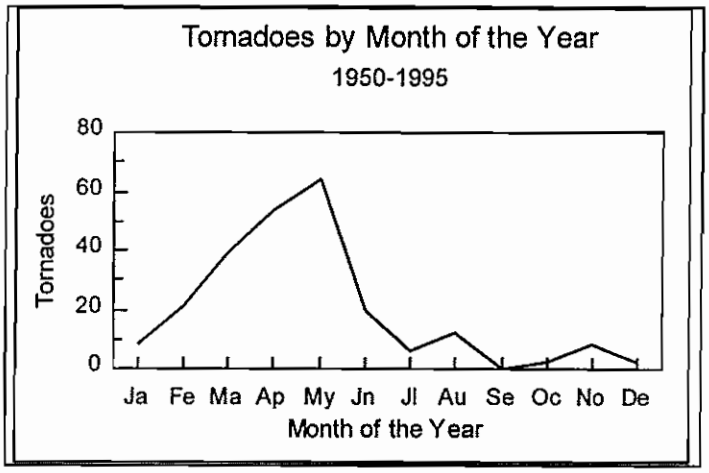

Fig. 7. NWSO Nashville CWA tornado distribution by months (1950-1995).

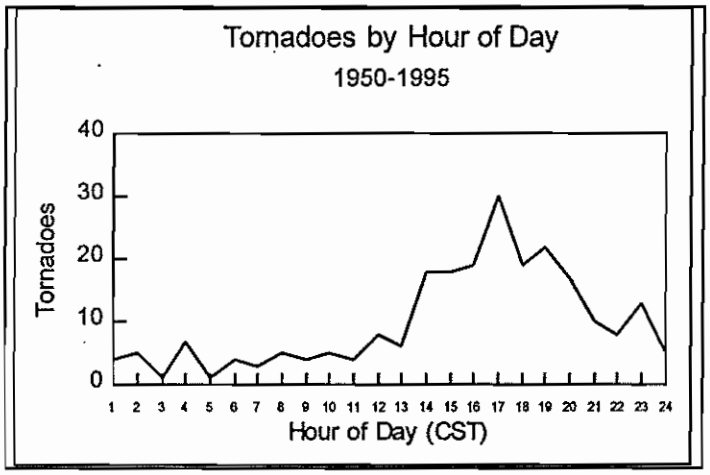

Fig. 8. Same as Fig. 7 except distribution by hour of the day.

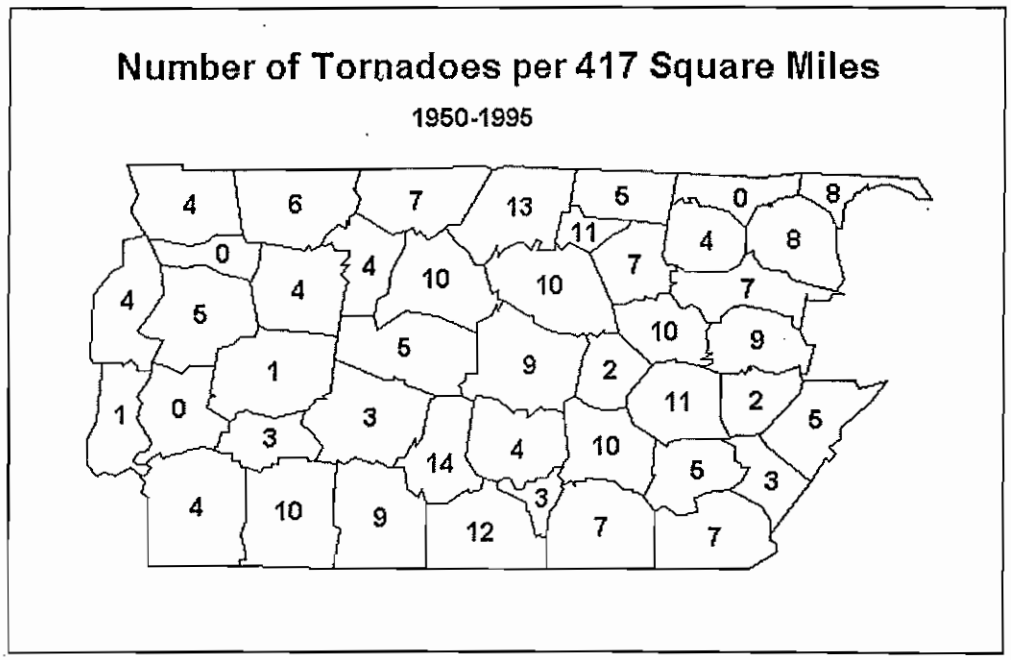

Fig. 9. NWSO Nashville CWA distribution of tornadoes (1950-1995) per 417 mi^2.

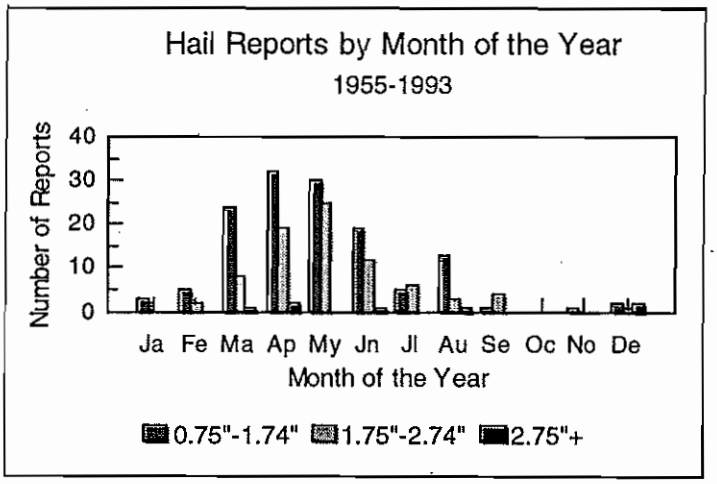

Fig. 10. NWSO Nashville CWA hail reports (1955-1993) by month and size.

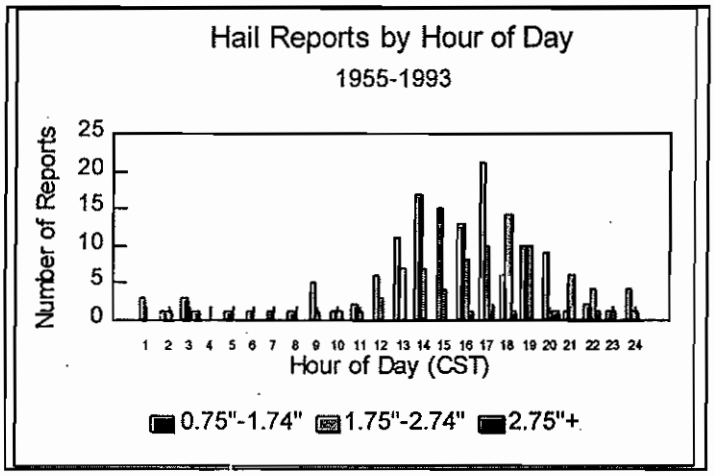

Fig. 11. Same as Fig. 10 except distribution by hour of the day.

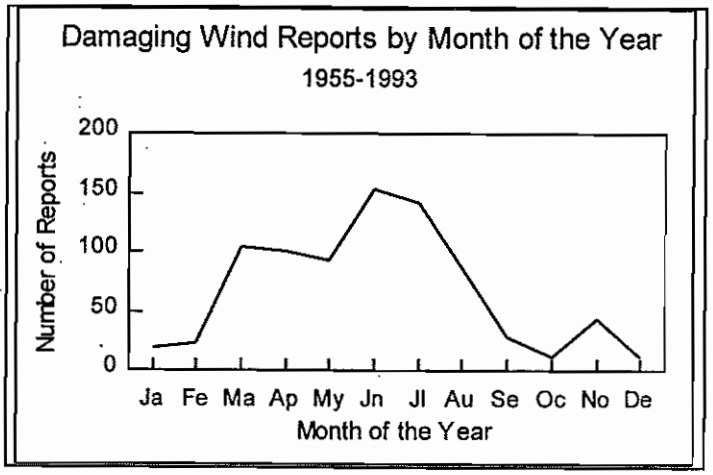

Fig. 12. NWSO Nashville CWA distribution of damaging wind reports (1955-1993) by month.

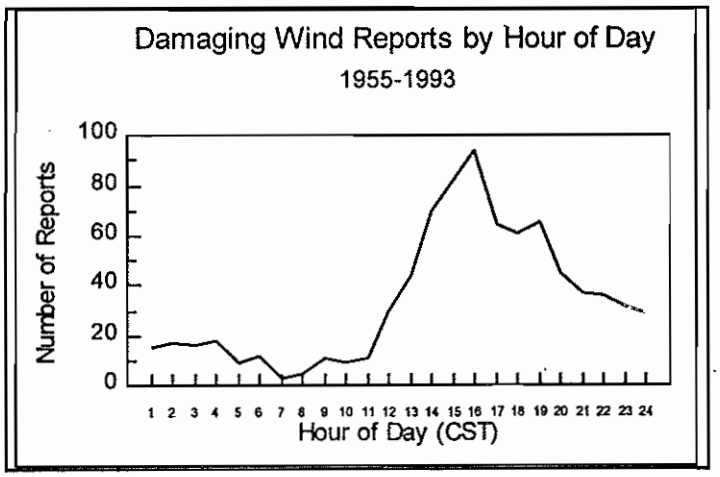

Fig. 13. Same as Fig. 12 except distribution by hour of the day.

Appendix

Tornadoes reported in the NWSO Nashville CWA
1950-1995

No	Yr	Mon	Day	Time	Begin Point		End Point		Death	Inj	Damage	F#
1	50	3	27	1500	3541	8546			0	0	3	1
2	51	11	14	2200	3513	8702			0	0	4	2
3	52	2	13	1700	3600	8807			0	0	4	2
4	52	2	13	1945	3603	8702			0	0	4	1
5	52	2	13	2100	3514	8649			0	0	0	1
6	52	2	13	2200	3513	8636	3513	8628	0	2	5	3
7	52	2	13	2230	3512	8618	3513	8605	3	44	5	4
8	52	2	13	2300	3515	8550	3516	8545	0	2	5	3
9	52	2	29	1600	3525	8642			3	166	4	1
10	52	2	29	1630	3509	8635			2	150	6	4
11	52	2	29	1640	3532	8551			0	0	4	2
12	52	3	21	2355	3551	8741			0	0	4	2
13	52	3	22	0020	3552	8735			3	10	4	2
14	52	3	22	1115	3615	8556			0	1	4	1
15	52	6	30	1805	3602	8646			0	0	3	1
16	53	1	20	1741	3542	8551			0	0	4	2
17	53	2	14	1200	3505	8635			0	0	3	1
18	55	2	1	1800	3534	8626	3536	9616	0	0	5	2
19	55	2	1	2300	3526	8543			0	0	4	1
20	55	3	4	2254	3637	8636	3638	8635	0	4	5	2
21	55	3	5	1500	3615	8557			0	3	4	1
22	55	3	5	1900	3600	8610			0	0	4	2
23	55	3	20	1920	3507	8706			0	2	3	1
24	55	3	21	1400	3510	8719			0	0	3	1
25	55	4	24	0330	3546	8513	3549	8508	0	0	5	1
26	55	5	12	1630	3613	8530	3618	8522	0	1	4	1
27	55	5	12	1758	3550	8623			0	0	4	1
28	56	2	17	2000	3509	8718	3509	8707	0	0	4	3
29	56	2	27	1530	3628	8639	3633	8624	0	4	4	3
30	56	3	7	0830	3623	8523	3626	8520	0	0	4	2
31	56	4	3	1945	3632	8627			0	0	4	1
32	56	7	13	1400	3609	8516			0	0	3	1
33	57	1	22	1630	3606	8652	3611	8637	0	4	6	2
34	57	1	22	1700	3615	8621			0	0	4	2
35	57	1	22	1830	3542	8624			0	0	4	1
36	57	1	22	2030	3534	8559	3535	8554	0	0	5	2
37	57	11	8	0200	3512	8701	3515	8658	0	0	3	2
38	57	11	18	0400	3625	8735			0	0	3	1
39	58	2	6	1630	3515	8720			0	0	3	1
40	59	3	26	1810	3615	8559	3626	8543	0	0	5	3
41	60	3	30	0010	3527	8647	3531	8640	0	1	4	2
42	60	8	17	1500	3630	8640			0	0	4	1
43	61	3	13	1640	3536	8555	3637	8545	0	0	5	3
44	61	4	25	1815	3626	8729	3628	8719	0	2	4	2
45	63	1	10	2355	3545	8656	3547	8652	0	4	6	3
46	63	3	11	1510	3515	8726	3520	8717	0	1	5	2
47	63	3	11	1620	3544	8632			0	0	4	2
48	63	3	11	1700	3506	8744	3512	8714	0	5	5	2
49	63	3	11	1800	3541	8546	3537	8543	0	0	5	2
50	63	3	11	1900	3500	8543	3509	8532	0	6	5	2
51	63	3	19	1240	3636	8638	3634	8623	0	0	5	2
52	63	4	29	2200	3502	8713	3502	8708	0	0	4	2
53	64	3	4	1130	3513	8808	3523	8800	0	4	6	3
54	64	8	12	0330	3522	8524			0	6	4	2
55	64	12	25	2200	3604	8646	3607	8641	0	0	6	1
56	65	3	17	0730	3520	8701			0	0	5	1
57	65	3	17	0800	3542	8548			0	1	4	1
58	65	3	17	0820	3514	8720			0	0	5	2
59	65	3	17	0900	3607	8625			0	0	3	1
60	65	3	17	0930	3550	8532			0	2	5	1

61	66	4	12	1200	3556	8610			0	0	3	1
62	66	4	30	1200	3606	8606			0	0	0	1
63	66	5	13	1500	3556	8528			0	0	4	1
64	66	6	16	1500	3623	8611			0	0	4	1
65	66	7	15	1600	3537	8703			0	1	4	1
66	67	5	7	0330	3622	8612	3624	8608	0	0	4	2
67	67	7	12	1700	3509	8628			0	0	4	1
68	68	4	4	1800	3512	8608			0	0	3	1
69	68	4	14	1800	3528	8606			0	0	0	1
70	68	4	23	1458	3557	8549			0	1	5	1
71	68	5	14	1615	3602	8652			0	0	0	1
72	68	5	25	1840	3617	8658			0	0	0	1
73	68	5	26	1540	3559	8708			0	0	0	1
74	69	1	23	1605	3629	8802			0	0	5	2
75	70	4	1	2030	3615	8556	3617	8553	0	2	4	1
76	70	4	27	1400	3627	8708	3633	8622	3	85	6	4
77	70	7	3	1850	3632	8732			0	1	4	1
78	71	3	6	1439	3506	8720	3510	8638	0	0	5	1
79	71	4	27	2031	3559	8614	3601	8558	0	3	5	3
80	71	5	6	1826	3511	8728			0	0	0	0
81	71	5	7	1845	3558	8812	3553	8754	0	0	4	4
82	71	5	7	1800	3607	8829	3602	8803	0	0	5	1
83	71	5	7	2115	3623	8721			0	0	0	0
84	71	5	24	2055	3618	8637			0	3	5	0
85	71	6	19	1910	3633	8625			0	0	0	0
86	72	4	7	1630	3618	8704	3610	8640	0	15	5	2
87	72	4	21	1515	3556	8652			0	3	5	1
88	72	4	21	2005	3508	8732	3522	8702	0	10	5	3
89	73	3	15	0200	3555	8530			1	3	5	2
90	73	4	25	1525	3610	8610			0	0	4	1
91	73	5	10	1245	3615	8640			0	0	3	1
92	73	5	10	1315	3612	8518			0	0	4	1
93	73	5	11	0830	3630	8600			0	0		1
94	73	5	19	1340	3619	8634			0	0	0	1
95	73	5	19	1415	3515	8631	3513	8628	0	0	4	1
96	73	5	22	1915	3632	8720			0	0	0	1
97	73	5	27	1000	3500	8620			0	0	5	2
98	73	11	26	1745	3626	8520			0	0	4	1
99	74	4	1	1845	3605	8724			0	0	5	1
100	74	4	1	1910	3607	8651	3612	8641	1	12	3	2
101	74	4	1	1945	3612	8632	3613	8618	0	4	6	1
102	74	4	3	1500	3629	8658	3634	8654	0	0	4	1
103	74	4	3	1618	3608	8644	3609	8639	0	0	6	2
104	74	4	3	1630	3536	8656	3540	8649	0	0	4	1
105	74	4	3	1700	3616	8612	3624	8558	0	0	6	2
106	74	4	3	1700	3532	8646	3540	8636	0	4	7	1
107	74	4	3	1710	3550	8626	3559	8613	0	0	3	3
108	74	4	3	1715	3527	8651	3537	8626	0	0	5	1
109	74	4	3	1815	3631	8452	3636	8446	0	0	4	2
110	74	4	3	1830	3623	8500	3625	8516	0	0	4	1
111	74	4	3	1830	3555	8603	3603	8551	1	23	5	3
112	74	4	3	1845	3500	8630	3519	8605	11	121	6	4
113	74	4	3	1900	3615	8536	3620	8529	0	0	5	1
114	74	4	3	1914	3350	8626	3530	8600	0	88	8	5
115	74	4	3	1915	3602	8534	3615	8508	10	51	6	4
116	74	4	3	1930	3631	8505	3635	8459	5	6	6	4
117	74	4	3	2000	3515	8600	3520	8556	0	1	4	3
118	74	4	3	2015	3531	8546	3536	8539	1	1	5	2
119	74	4	3	2100	3517	8655	3522	8629	0	0	3	1
120	74	4	3	2230	3621	8523	3626	8515	3	120	6	3
121	74	4	3	2245	3545	8550	3549	8544	0	1	4	1
122	74	4	3	2245	3602	8524	3603	8521	0	0	3	1
123	74	4	3	2330	3556	8520	3557	8517	0	8	4	2
124	75	3	12	1030	3508	8732	3514	8721	0	3	5	1
125	75	3	12	1145	3530	8615	3532	8553	0	0	5	1
126	76	2	17	2300	3555	8650	3559	8630	0	2	5	1
127	76	2	17	2315	3601	8635	3612	8617	0	0	5	1

128	76	3	20	2225	3609	8626	3606	8619	0	0	5	1
129	76	5	28	1800	3524	8512			0	0	4	0
130	77	3	28	0534	3631	8602			0	0	5	2
131	77	6	6	1520	3512	8637	3509	8628	0	0	3	0
132	77	10	1	1630	3625	8527	3622	8520	0	1	5	0
133	78	4	18	0200	3516	8645			0	0	4	1
134	78	4	18	0345	3512	8718			0	0	5	1
135	79	4	11	2300	3604	8722			0	0	3	0
136	79	6	30	0030	3615	8536			2	1	4	1
137	80	3	24	1230	3551	8623	3552	8621	0	2	5	2
138	80	4	8	1020	3535	8642			0	0	2	0
139	80	4	8	1046	3548	8631			0	0	4	1
140	80	5	17	1430	3615	8636			0	1	5	1
141	80	5	17	1430	3620	8627			0	3	4	1
142	80	6	24	1400	3539	8553			0	0	3	1
143	80	6	29	1000	3501	8649			0	0	4	2
144	80	7	5	1800	3623	8632	3617	8631	0	0	4	2
145	80	7	6	1400	3500	8544			0	0	4	1
146	80	8	29	1345	3605	8602			0	0	4	1
147	81	4	17	0710	3628	8642			0	0	4	1
148	81	6	6	0550	3600	8757			0	0	0	0
149	81	6	6	0620	3609	8739			0	0	4	0
150	82	3	20	0800	3637	8627			0	0	4	1
151	82	4	17	0345	3523	8656			0	0	4	1
152	82	6	3	1315	3503	8538			0	0	4	1
153	83	5	29	1600	3549	8539			0	1	4	1
154	83	6	4	0000	3542	8516	3543	8523	0	0	5	1
155	83	8	22	2125	3528	8519			0	0	1	0
156	83	11	23	0930	3559	8746			0	0	4	1
157	84	3	15	2020	3611	8720			0	0	5	1
158	84	4	22	0400	3507	8629	3509	8625	0	0	4	1
159	84	5	6	0515	3635	8631			0	0	5	2
160	84	5	6	0520	3636	8631			0	0	4	2
161	84	5	6	0745	3530	8605	3532	8600	0	0	4	1
162	84	5	6	1000	3633	8602			0	0	1	1
163	84	5	7	0114	3628	8657	3629	8654	0	0	5	2
164	84	5	7	0130	3559	8632			0	0	4	1
165	84	5	7	0215	3601	8551			0	0	5	1
166	84	5	7	0430	3538	8642			0	0	0	1
167	84	5	7	0700	3551	8625			0	0	0	1
168	84	5	7	1300	3536	8806			0	0	4	1
169	84	5	7	1300	3625	8717			0	0	0	1
170	84	5	7	1320	3605	8723			0	0	0	1
171	84	5	7	1325	3626	8746			0	0	0	0
172	84	5	7	1330	3624	8739			0	0	0	0
173	84	5	7	1425	3536	8718			0	0	0	1
174	84	5	7	1430	3624	8620			0	0	5	1
175	84	5	7	1430	3527	8648			0	0	5	1
176	84	5	7	1505	3611	8519			0	0	4	1
177	84	5	26	1315	3509	8635			0	0	0	0
178	84	10	23	1315	3507	8536			0	0	4	0
179	84	11	10	1430	3624	8627			0	3	4	1
180	85	4	5	1615	3525	8614			0	0	3	1
181	85	6	4	1630	3616	8627	3613	8622	0	0	4	2
182	85	8	16	1400	3514	8701	3526	8701	0	1	5	3
183	85	8	16	1530	3520	8703	3525	8703	0	0	3	2
184	85	8	16	1600	3506	8643	3512	8645	0	0	3	2
185	85	8	16	1750	3547	8645			0	0	3	1
186	85	8	30	1900	3626	8712			0	0	2	1
187	86	2	17	1440	3559	8707			0	0	5	0
188	86	4	20	1825	3505	8536			0	6	5	1
189	86	5	26	1200	3637	8512			0	0	4	0
190	88	6	18	1605	3505	8627	3500	8621	0	0	4	2
191	88	11	4	1545	3515	8750	3525	8739	0	0	5	2
192	88	12	24	0604	3555	8654	3602	8647	1	7	7	4
193	89	5	22	1937	3503	8709	3509	8700	1	2	5	2
194	90	2	9	2213	3516	8608			0	0	4	1

195	90	2	9	2225	3517	8559			0	0	3	1
196	90	5	20	1445	3523	8717			0	0	4	1
197	90	6	9	1543	3536	8855			0	0	0	0
198	91	3	22	1700	3614	8805	3614	8758	0	0	6	2
199	91	3	22	1730	3523	8801			0	0	5	1
200	91	3	22	1805	3529	8738	3533	8734	1	14	7	2
201	92	5	12	1800	3605	8747			0	0	5	0
202	92	5	12	2019	3533	8738			0	0	2	0
203	92	8	27	1500	3527	8648			0	4	3	0
204	92	8	27	1750	3607	8625			0	0	4	0
205	92	8	27	1850	3610	8622			0	0	4	0
206	93	2	21	1352	3610	8536	3606	8526	0	6	5	3
207	94	4	27	1340	3514	8724			0	0	2	0
208	94	5	14	1700	3536	8520			0	0	3	0
209	94	6	26	1800	3525	8559	3527	8556	0	0	4	0
210	94	6	26	1830	3526	8549	3526	8544	0	6	5	2
211	94	6	26	1915	3520	8519			0	0	5	2
212	94	6	26	1930	3508	8612	3513	8605	0	0	4	1
213	94	6	26	2000	3509	8757	3459	8726	0	19	6	3
214	94	6	26	2200	3526	8743	3527	8739	0	0	4	1
215	94	11	27	1635	3636	8749			0	0	4	0
216	95	1	28	1555	3545	8633	3547	8630	0	0	4	1
217	95	3	7	1326	3629	8619			0	0	4	0
218	95	3	7	1930	3501	8543			0	0	4	0
219	95	4	20	2255	3508	8612	3510	8609	0	0	5	1
220	95	4	21	0018	3502	8533	3504	8527	0	1	4	1
221	95	5	10	1600	3512	8532			0	1	5	0
222	95	5	14	0355	3608	8532			0	0	4	0
223	95	5	18	1058	3607	8713			0	0	0	1
224	95	5	18	1130	3618	8643	3624	8627	0	28	6	2
225	95	5	18	1215	3628	8611			0	0	5	1
226	95	5	18	1530	3515	8740			0	0	3	0
227	95	5	18	1552	3500	8729	3521	8710	3	32	6	4
228	95	5	18	1555	3545	8639	3545	8633	0	4	4	0
229	95	5	18	1630	3551	8548	3549	8548	0	0	3	0
230	95	5	18	1647	3520	8712	3520	8708	0	1	5	0
231	95	5	18	1650	3625	8712			0	0	3	0
232	95	5	18	1652	3622	8642	3630	8638	0	0	3	1
233	95	5	18	1700	3529	8628	3527	8611	0	1	5	1
234	95	5	18	1715	3625	8659			0	0	3	0
235	95	5	18	1730	3529	8605			0	0	4	0
236	95	5	18	1845	3540	8522			0	0	3	0